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Host-free Survival of Boll Weevils (Coleoptera: Curculionidae) from Two Regions of Texas

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New information regarding boll weevil, *Anthonomus grandis* Boheman, overwintering is important to efforts to improve efficiency of eradication efforts. The boll weevil diapause remains a contentious issue despite intense study (Spurgeon et al. 2003, Spurgeon and Raulston 2006), and some evidence suggests the diapause response differs among weevil populations (Rummel and Summy 1997). Recently, Spurgeon and Raulston (2006) found diapause can be induced by manipulating the adult diet, and that responses of weevils from Central Texas and the Lower Rio Grande Valley were comparable. We used similar dietary methods to examine ensuing host-free survival of weevils from two widely separated locations in Texas.

Oviposition-punctured squares were collected in early September 1998 from commercial cotton, *Gossypium hirsutum* L., near Lubbock, TX. The squares were held in 30 × 30 × 30-cm screened cages at 23.9 ± 1° C and a photoperiod of 11:13 (L:D) h within a chamber at the Kika de la Garza Subtropical Agricultural Research Center, Weslaco, TX. Emerged adults were collected from the cages daily, sexed using the method of Sappington and Spurgeon (2000), and marked on one elytron (to indicate gender) with a non-toxic paint pen. Three groups of about 200 weevils each (emerging 11-14, 15-16, and 16-17 September, respectively) were held in screened cages in the environmental chamber. To induce diapause, one debracted square (6-9 mm diameter) was provided per two weevils and replaced thrice weekly. After feeding for 18-21 d, 50 weevils of each sex were selected from each cage, numbered individually with a technical pen, and transferred to a screened cage (20 × 20 × 20-cm) for determination of survival. Each survival cage contained a vial of deionized water closed with a cotton wick, and a refuge of pleated craft paper (30 × 45-cm). Excess weevils were dissected and classified as diapausing or reproductive using the criteria of Spurgeon et al. (2003). Survival was assessed weekly.

Because of the mandated 1 September crop destruction deadline, weevils from the Lower Rio Grande Valley were obtained from infested squares collected from caged cotton plants near Weslaco, TX, in late September 1998. Infested squares and resulting weevils were handled similarly to those from Lubbock. The supply of infested squares was limited, resulting in only 38 weevils (16 females and 22 males, emerged 1-6 October and fed for 16-21 d) for determination of survival. Thus, no weevils from Weslaco were dissected. Survival data for five weevils were censored, so survival of weevils from Lubbock and Weslaco was compared using the SAS LIFETEST procedure (SAS Institute 2002).

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Totals of 148 (range of 43-55) female and 115 (range of 30-49) male weevils from Lubbock were dissected following the feeding period. Percentages of weevils classed as diapausing ranged from 91-98% for females and 84-93% for males. Therefore, the experimental conditions resulted in a high incidence of diapause. Preliminary analyses comparing survival of weevil sexes within each cage did not indicate the need to control for gender (*P*-values ranged from 0.10 to 0.56). When survival of weevils was compared between locations, no statistical difference was detected (χ^2 = 0.32, df = 1, *P* = 0.57; Fig. 1). These results do not indicate fundamentally different responses to our experimental conditions by weevils from the Texas High Plains and Lower Rio Grande Valley. Because we found no differences in host-free survival between these populations under controlled conditions, our findings suggest a need to focus instead on the overwintering environment when interpreting the apparent differences in the dynamics of boll weevil overwintering between temperate and subtropical regions.

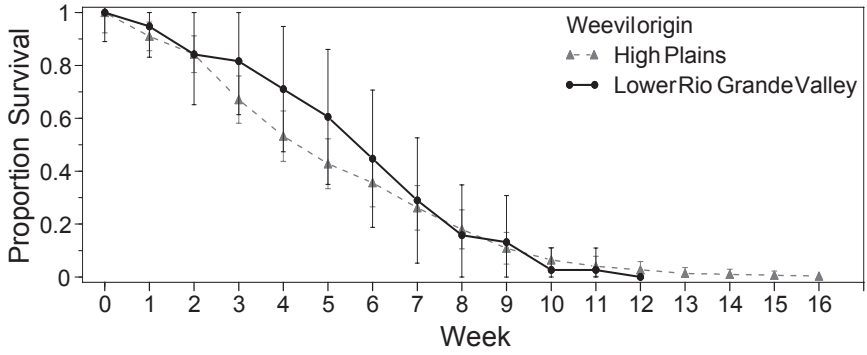

Fig. 1. Host-free survival (± SE) of adult boll weevils from two areas of Texas, under controlled conditions (23.9 ± 1°C, 11:13 h photoperiod) after a 16-21 d feeding period.

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